IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

William B. Ardern II	Attorney Docket No.: ARD-101US
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Title: BINDER CLIP SLEEVE

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Declaration of James S. Marschalek
(Submitted pursuant to 37 C.F.R. §1.312)

James Marschalek declares as follows:

1. My name is James Marschalek. I am presently the Vice President of Engineering for Advanced Design Concepts, Inc. (hereinafter "ADC") of Pewaukee, Wisconsin. I have held this position at ADC for two years and have been employed by ADC for seven years. As Vice President of Engineering of ADC, I am responsible for providing engineering design and analysis services for ADC's engineering customers and for support of internal company engineering development projects. Prior to becoming Vice President of Engineering, I also was involved in engineering design and analysis for ADC. I am a graduate of the University of Wisconsin - Madison, receiving a Bachelor's Degree in Mechanical Engineering.

2. Among the types of analysis in which I am involved is finite element analysis of structures (hereinafter "FEA"). The finite element analysis described in this declaration was performed using Pro/ENGINEER computer-aided design (hereinafter "CAD") software and the Pro/MECHANICA finite element analysis module which works with Pro/ENGINEER. I am proficient in use of these software programs.

3. I was asked to create and analyze a model of the stencil indicator described in United States Patent No. 1,232,747 (Yochim) (hereinafter "Yochim"). The purpose of the model was to establish the behavior of the Yochim stencil indicator should someone attempt to use that stencil indicator as what is commonly known as a "binder clip." The following definition from www.wikepedia.org fairly describes a binder clip:

> A binder clip is a strip of stainless sheet steel [or other material type] bent into the shape of an isosceles triangle with loops at the apex. Tension along the base of the triangle forces the two sides closed, and the loops prevent the sharp steel edges from cutting into the paper. The loops also serve to hold two pieces of stiff wire, which serve as handles and allow the clip to be opened. The two slots cut in each loop are shaped so that the wire handles can be folded down once the clip has been attached, and the spring force of the wire holds them down on the surface of the paper. This holds the clip relatively flat, for easier stacking of paper. ... As compared to a paper clip, the binder clip is able to bind sheets of paper more securely.

4. In order to perform this work, I first carefully read the Yochim patent. I then generated two CAD model replicas of the Yochim stencil indicator based on Yochim's Figures 1 and 2 and the Yochim patent text.

5. In generating the two CAD models of the Yochim stencil indicator, I first assumed that Yochim's stencil (ref. no. 1) had a length dimension of 11 inches, a typical dimension for objects stored in files. Based on this assumption and the ratios of dimensions shown in Yochim Figures 1 and 2, I then determined that the Yochim stencil indicator would have a height of 2.55 inches, and a material thickness of 0.054 inches. As indicated in Yochim Figure 1, the stencil indicator (ref. no. 2) would have an assumed length of 11 inches because the stencil indicator is co-extensive with the stencil (ref. no. 1). I further assumed that the Yochim stencil indicator (ref. no. 2) was made of steel sheet metal because Yochim uses sheet metal (Yochim at lines 48-50) and because steel sheet was a commonly-available material. The first CAD model was generated using these values.

6. A second CAD model was prepared in which all of the foregoing dimensions and materials were identical to the first model except that the material thickness was assumed to be 0.020 inches. This thickness was chosen because 0.054 inches seemed excessively thick and because conventional binder clips have a material thickness of about 0.020 inches.

7. As will be explained below in connection with the discussion of the properties of the Yochim stencil indicator, it was necessary and appropriate to further assume that the tips of the Yochim stencil indicator are not in direct contact with each other when the stencil indicator is not attached to a stencil. Stated differently, the material properties of the Yochim stencil indicator are such that there must be a gap (G) between the tips when the stencil indicator is relaxed and is not attached to a stencil or paper file. As discussed below, the required gap between the tips is about 0.1 inches based on the dimensions set forth in paragraph 5.

8. Under all of these assumptions, the Yochim stencil indicator made from steel sheet 0.054 inches thick would weigh 1.38 pounds, an inordinately high weight for a binder clip, and likely even a stencil indicator. The Yochim stencil indicator made from steel sheet 0.020 inches thick would weigh 0.51 pounds, also a very significant weight. Both of these weights are such that the Yochim stencil indicator would bend paper or paper files to which the stencil indicators were attached unless those paper files were extremely stout.

9. Attached Exhibits A, B, and C are three views of the Yochim stencil indicator that I generated. Exhibit A is an end elevation view of the modeled Yochim stencil indicator having a material thickness of 0.054 inches. Exhibit A was generated using the Pro/Engineer CAD software. Exhibit A shows the length, height, material thickness, and gap (G) dimensions of that modeled stencil indicator. A similar CAD model was generated for the 0.020 inch thick version of the Yochim stencil indicator (not shown).

Exhibits B and C are front- and rear-side perspective views of the FEA-modeled Yochim stencil indicator having a material thickness of 0.020 inches. Exhibits B and C were generated using the Pro/MECHANICA software module. The FEA-modeled Yochim stencil indicator of Exhibits B and C includes a gap (G) of 0.1 inches between the tips consistent with the modeled stencil indicator of Exhibit A. A similar FEA model was generated for the 0.054 inch thick version of the Yochim stencil indicator (not shown).

10. The FEA model for the 0.020 inch thick modeled stencil indicator shown in Exhibits B and C incorporated 1,196 elements so that the results of the finite element analysis (FEA) generally provided an excellent representation of the behavior of Yochim's stencil indicator under load.

11. As indicated in Exhibits A, B, and C, point loads (P) were applied numerically at the middle of the length of the stencil indicator at points at the tips (at lower ends of flanges 7 and 8 in Yochim Figure 2) to model an attempt to use the stencil indicator as a binder clip.

12. Point loads sufficient to increase gap G by a further 0.1 inches were applied in the analysis. For the first FEA model having a steel thickness of 0.054 inches, it was observed that there was almost no variation of the gap (G) along the length of the Yochim stencil indicator from the mid-point (the point at which the load P was applied) to the ends of the stencil indicator.

13. For the second FEA model having a steel thickness of 0.020 (the more flexible of the two models), such forces resulted in a maximum variation along the length of the stencil indicator of only 0.0035 inches. This small variation along the length indicates that the stencil indicator is a very stiff structure.

14. Exhibits B and C present results of the finite element analysis for the stencil

indicator having a 0.020 inch thickness, showing color-coded representations of the displacement of the various regions of the stencil indicator under the loaded condition described above. In Exhibits B and C, the fact that the colors are generally constant in regions parallel to the length is the indication that the stencil indicator is a stiff structure, that when opened with point loads at its mid-point, the stencil indicator opens all along its length. Point loads of less than the calculated force result in commensurately smaller increases in gap G.

15. For the first model having a steel thickness of 0.054 inches, the value of force P to achieve an increase in spacing of 0.1 inches between the tips was calculated to be 38.5 pounds.

16. For the second model having a steel thickness of 0.020 inches (Exhibits B and C), the value of force P to achieve an increase in spacing of 0.1 inches between the tips was calculated to be 1.58 pounds.

17. For the model of the stencil indicator having a material thickness of 0.054 inches, the force required to open the indicator 0.1 inches (increase the gap by a further 0.1 inches) is a completely impractical force, even with the aid of leverage from handles. If one assumes the addition of handles by which to apply the point loads P, handles with any reasonable leverage would, in fact, be impractically long. (A conventional binder clip has handles about twice as long as the end-height of the clip with the fulcrum in the middle, thus providing no mechanical advantage for the user - *i.e.*, the lever ratio is 1:1.)

18. If there were no gap between the tips of the Yochim stencil indicator, that device would have to be slid onto the stencil or paper file without first spreading the tips. This would result in damage to the stencil or to the paper file as the sharp metal edges of the stencil indicator would be pushed onto the stencil or paper file. To illustrate this problem, the reader is invited to attempt to fit a conventional binder clip over a stack of

papers without using the handles. It is apparent that doing this will damage the papers unless the tips are first separated in some way.

19. Based on the stiffness of the modeled Yochim stencil indicator and the force required to open both models of the Yochim stencil indicator, it is necessary and appropriate to assume that the Yochim stencil indicator includes a gap G between the tips and to further assume that the tips are not preloaded into direct contact with each other together as is the case in a conventional binder clip. Such a gap G would be required in order for the Yochim stencil holder to fit over the stencil or paper file because Yochim does not include any handles to spread the tips apart.

20. The presence of the gap required by the models presents problems which render the modeled Yochim stencil indicator inadequate and inappropriate for use as a conventional binder clip as that product is understood, for example in paragraph 3 above.

21. One obvious deficiency preventing use of the Yochim stencil indicator as a binder clip is that the Yochim stencil indicator could not grip objects having a thickness less than that of the gap. This is, of course, contrary to the purpose of a binder clip.

22. A further deficiency preventing use of the Yochim stencil indicator as a binder clip is that the Yochim stencil indicator would not exert sufficient force to hold narrower articles. For the second model of the Yochim stencil indicator having a material thickness of 0.020 inches (Exhibits B and C), the normal force on, for example, a 0.2 inch thick object (stencil, a stack of paper, etc.) would be about 3.16 pounds (1.58 x 2). Friction coefficients for steel on paper range from 0.2 to 0.6, thus holding the object in the "stencil as a clip" with a force ranging from 0.632 to 1.896 pounds. A stack of paper 0.2 of an inch thick weighs approximately 0.44 pounds so that the forces holding the object in the stencil indicator, if used as a clip, may not be much greater than the weight of the stack of paper. As such, the stencil indicator would be ineffective as a

binder clip. A binder clip that is incapable of holding together small groups of papers is, in my judgment, an ineffective binder clip.

23. Yet another deficiency is that the Yochim stencil indicator, with the required gap, would not include a preload gripping force typical of conventional binder clips. As is known, conventional binder clips include a preload force which urges the tips tightly into contact with each other. The preload force is required to provide suitable frictional forces to hold objects between the tips. The gap, essential for use as a stencil indicator, precludes the use of a preload.

24. Still another deficiency preventing use of the Yochim stencil indicator as a binder clip is that the Yochim stencil indicator would have an excessive weight that would bend or damage articles being gripped by the stencil indicator as noted in paragraph 8 above.

25. An additional deficiency preventing use of the Yochim stencil indicator as a binder clip is that the Yochim stencil indicator makes no mention of any handles whatsoever to spread the tips to receive articles wider than the required gap (G) between the tips. A handle component was not contemplated from the text and drawings of Yochim. Without a means to spread the tips, it is possible that any stencil or paper file significantly wider than the gap could be damaged by the sheet metal forming the indicator.

26. My conclusions about the foregoing deficiencies in the Yochim stencil indicator which render such a stencil indicator inadequate and unlike a binder clip are not tied to the absolute values assumed for the stencil indicator length or gap, but rather these numbers are used as examples to help frame the conclusions I have reached, even though I believe these assumptions are reasonable. Rather, and more importantly, the essential inclusion of a gap for a stencil indicator, the essential lack of a gap for a binder clip, and

the approximate force levels and object weights lead me to these conclusions.

27. To be effective as a binder clip, the clip must do at least two things. First, it must be able to hold together a full range of objects, including small quantities of thin articles, such as paper sheets. Second, it must hold these objects together securely so the articles do not fall out of the clip. The binder clip should not tear, crease, bend or otherwise damage the article or thing being gripped when the clip is attached to or removed from such articles or things.

28. Based on the foregoing, I conclude that the Yochim product may function adequately as a stencil indicator but would not function adequately as a binder clip. Yochim cannot fairly be likened to a binder clip because Yochim would not be effective for holding together small groups of articles, such as papers.

29. Given the structural and operational differences between the Yochim stencil indicator and a conventional binder clip and the contradictory or inconsistent purposes of these products, I believe that a person of ordinary skill in the mechanical arts would find it difficult and challenging to combine these products. As already noted, the Yochim stencil indicator must be designed to avoid the gripping that is required for proper operation of a binder clip. Therefore, it cannot be said that Yochim could be converted to a binder clip simply by bending Yochim differently or using a different material to make Yochim. If this was done, the resultant product would not be suitable for use as a stencil indicator as envisioned in the Yochim patent. Further, it also cannot be said that a binder clip could simply be bent differently to provide a gap between the jaws because to do so would prevent the binder clip from gripping thin articles. In short, a Yochim stencil indicator is not a binder clip and a binder clip is not a stencil indicator as envisioned by Yochim. I do not believe that a person of skill in the mechanical arts would look to the teaching of Yochim as a teaching of a binder clip.

* * *

I declare that: all statements made herein of my own are true and that all statements made on information and belief are believed to be true; that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under § 1001 of Title 18 of the United States Code; and that willful false statements may jeopardize the validity of the application of any patent issuing thereon.

9/24/07

James Marschalek Date